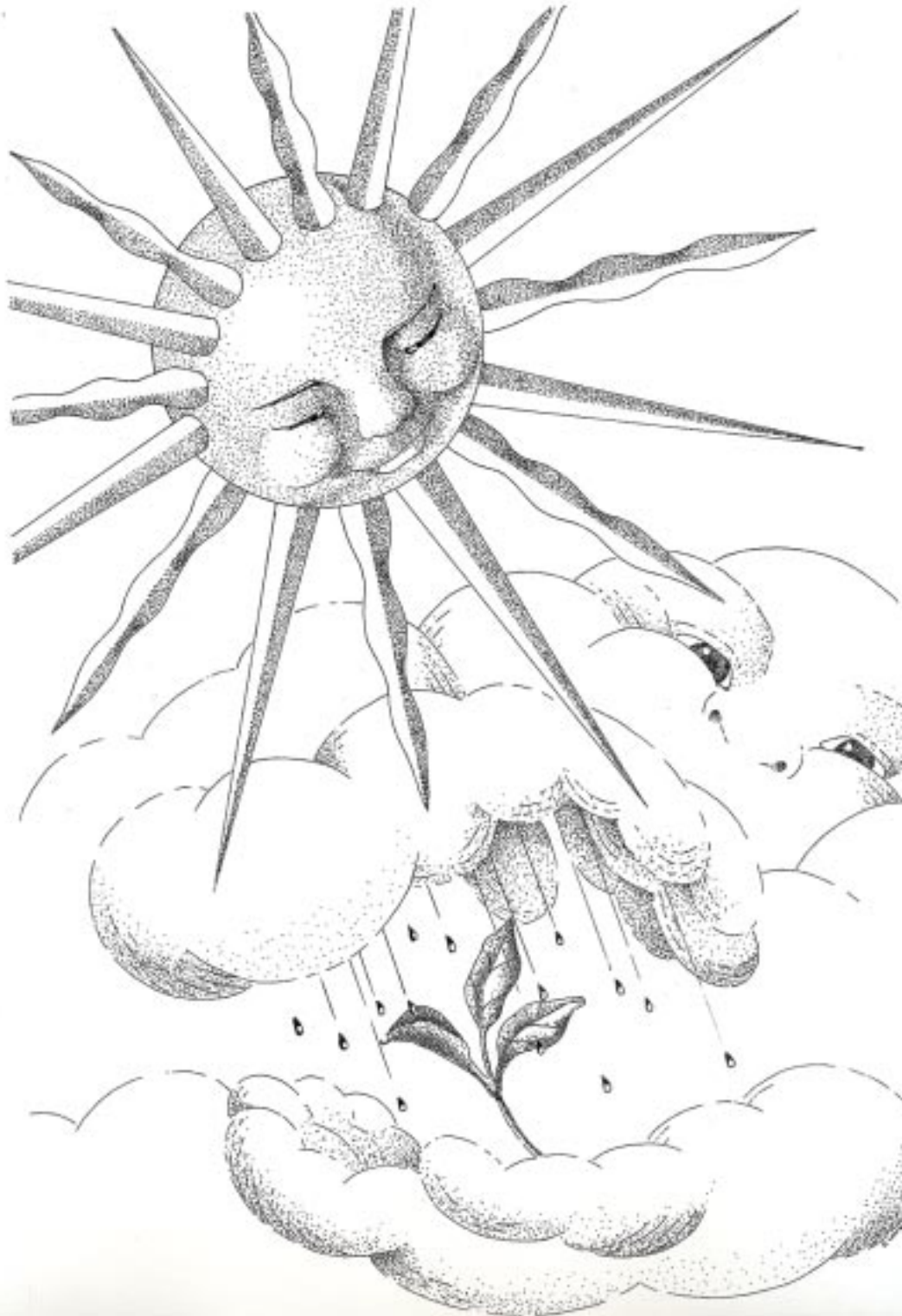


SECTION 2

RESTORATION



RESTORATION

2.1 THE RESTORATION CYCLE

Our goal, **restoration** of Milagra Ridge, will be achieved by supporting the ridge's indigenous plants, animals, and processes. Restoration follows a seasonal cycle; to restore an area, we work with nature to support the natural systems.

We plant native plants for several reasons: to repair eroded or trampled/disturbed areas; to restore areas where weeds have been removed, leaving bare ground; and to support endangered species by increasing their host plant populations, see page 91.

In **winter**, when the rains have soaked the soil, we outplant the native plants we have grown in the nurseries. These plants need to establish their roots before the soil dries out. Generally the best months for planting on Milagra Ridge are December through February. If the winter is dry, we supplement nature's rain as much as possible by hand-watering so the plants can survive this initial period. We hope that by the end of winter, the plants will have well-established roots that will enable them to survive the dry summer months.

In **spring**, new plants - including weeds - are sprouting. We **remove the invasive weeds** before they drop their seed, which typically begins in late spring and continues through summer. We prioritize, first removing the fastest-spreading weeds, those that may threaten endangered species habitat or large areas of the ridge.

Invasive exotic plants is one of the greatest current threats to Milagra Ridge. These plants, originally brought here by people or animals, have spread out of control. They often grow over native plants or bare ground, reducing or eliminating other species' chances of survival. We perform weed removal throughout the year, especially at times when the weeds are about to set seed.

Another spring activity is **monitoring**. We do several types of monitoring. For endangered species monitoring, we take a systematic approach, looking at specific endangered species to see if their populations are increasing or decreasing. The Mission blue butterfly, San Bruno elfin butterfly, and red-legged frog are all active in the spring, which makes the season an important time to look for them. We use **transects** to search the same spots year after year. Using transects is a

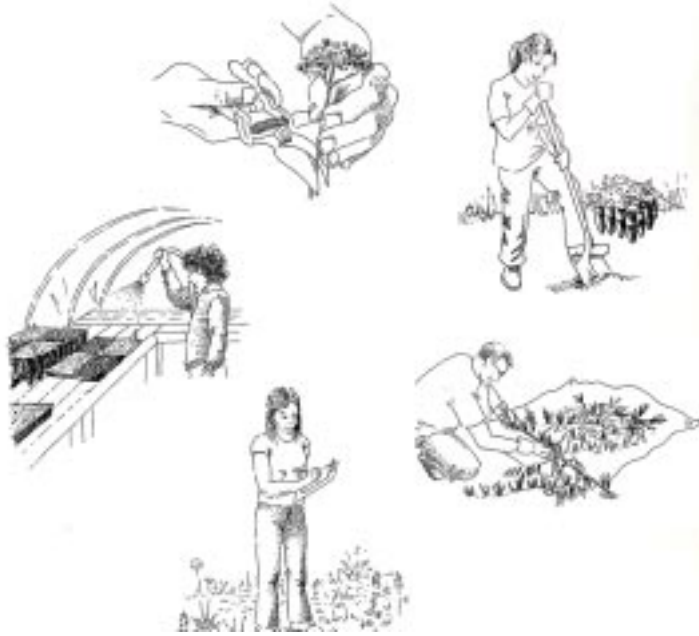


Figure 2.1 Restoration Cycle

sampling technique that enables us to quantify population trends.

We **monitor our plantings** to see what percentage of the plants we put in the ground survive. Additionally, we have **photomonitoring** points, places to which we return each year and photograph. With the photos, we can record the restoration of natural habitats or the expansion of weeds in a given location over time. Monitoring is one way we track changes over time; it also helps us understand the natural systems and the impact we are having at Milagra Ridge.

Spring is also the beginning of **mapping** season. In order to plan our restoration work throughout the year, we need accurate maps for each weed species. Since species spread throughout the year, or decrease if we remove them, the maps are updated annually.

In spring, with the wildflowers blooming, we share the ridge in all its glory with the public. **Wildflower walks** are a relaxing way to provide an opportunity for people

to see and appreciate the natural beauty we are working with and trying to protect.

Late spring and summer are the beginning of **seed collection**, an activity that lasts into fall. Remember your botany? As flowers are pollinated, they form seed in their ovaries. Each species has a different time of flowering and seed ripening, and restoration interns follow the plant cycles to collect seed for each species we grow. We only collect up to 5 percent of the seed per plant or per population, leaving most of it to **germinate** naturally where it lands.

Once we have collected seed, we **propagate** it in the nurseries. As each species has its own timing, the period when it grows best, we start to **sow seed** in May or June and continue throughout the summer, following each species' cycle. In the nurseries, we **keep good propagation records**; they are the basis for our understanding of individual plants and systems. We learn the best way to grow plants by trying different timing and methods and noting successes and failures. The information we get by analyzing our work is important because this information

isn't readily available otherwise. Our experiences and information are shared to help others learn how to successfully grow indigenous plants.

Summary of the Restoration Cycle

■ **Winter** is a time of intense outplanting. For example, in the winter of 1999-2000, we put more than 10,000 native plants in the ground at Milagra Ridge.

■ **Spring** is wildflower season and a time of monitoring, the beginning of seed collection, and propagation.

■ **Summer** is a continuation of seed sowing and collection, mapping, and monitoring.

■ **Fall** is a time of major seed collection effort and making sure that nursery plants stay alive until we can outplant them.

Throughout the year, we plan our restoration efforts and remove invasive weeds.

2.2 OCEANA NATIVE PLANT NURSERY CALENDAR

January

Outplanting season - keep the plants alive in the nursery until they go into the ground. There is not much sun, so don't overwater.

Nursery Activities for Interns

- Pot washing.
- Inventory plants frequently, report counts to SSP staff for planning outplanting workdays.
- Daily crop monitoring and walk-

throughs.

■ Inventory supplies; make sure there's enough bleach, brushes, tools, rubber gloves, and basins (wheelbarrows, etc.) for pot washing. Purchase supplies if needed.

■ Weed front and back circles and the demonstration (demo) garden.

Group Workday Activities

- Pot washing.
- Outplant on the ridge.
- Plant into parking lot circles.
- Weed front and back circles and the demo garden.

February

Outplanting season - Plants are usually still going in the ground at Milagra Ridge. Meanwhile, keep them healthy in the nursery.

Nursery Activities for Interns

■ Continue daily walk-throughs; consolidate dead or dying plants. Keep an eye out for bugs and disease on the plants and their roots. Water only when soil is dry (see watering instruction cards).

■ Coordinate pot-washing parties with students from class.

■ Manage compost pile, adding the dirt from the plants that have been consolidated.

■ Inventory plants weekly for outplanting planning.

■ If you have time, weed front and back circles and demo garden.

Group Workday Activities

■ Consolidate plants. Compost dead/dying plants (do not use the compost for next year's crop-it might have weeds or disease).

■ Outplant on the ridge.

■ Winter rains bring a lot of weeds in and around the nursery-pull out weeds underneath benches, in the greenhouse, or coming up through the mulch.

- Start cleaning out the nursery for the next growing season. Empty benches, tables, and pallets need to be hosed off and scrubbed down with a bleach solution. (Get a scrub brush from the pot-washing kit, add 1 tablespoon of bleach per gallon of water-do not use more than 1 percent bleach). Wear old clothes, safety glasses, and rubber gloves! This could take two to three students the better part of an afternoon.

- Pot washing: Two groups of three to five students is the maximum number of people who can do this activity at a time.

- Keep up with weeding the front and back circles and the demo garden.

March

Outplanting season should be over by now and the nursery should be empty of plants. Most of this month's work is maintenance and pot washing.

Nursery Activities for Interns

- Be sure February activities are completed.

- Coordinate pot washing with the environmental science class.

- Pick up any trash around the site.

- Pull any weeds that have come up through the mulch or gravel in and around the nursery and greenhouses.

- Continue nursery checks and inventories for any remaining plants.

- Complete a thorough inventory of nursery materials by the end of the month.

- Make sure there are enough soil and pots on hand (or on order) for the coming season. If there aren't enough pots of the right sizes, you can swap with the Presidio or Fort Funston nurseries or order from park suppliers.

- Assist with publicity for upcoming Milagra Ridge activities by posting flyers in Pacifica and at school.

- Weed front and back circles and demo garden.

Group Workday Activities

- Wash and sterilize pots (see instruction card).

- Continue outplanting if needed, or begin weeding on Milagra Ridge.

- If appropriate, start seed collection of early-flowering herbs at Milagra Ridge.

- Weed front and back circles and demo garden.

April

Springtime - get ready to plant in the nursery! April is about making sure all the pots are clean and sterile and the irrigation system is set up and functioning. Compost pile can be given away to students and parents.

Nursery Activities for Interns

- Inventory seeds at Fort Funston and Headlands native plant nurseries for Oceana plants and determine when to start propagation.

- If appropriate, assist SSP intern with seed collection on Milagra Ridge.

- Attend SSP wildflower walk and workdays on Milagra Ridge.

- Assist with publicity for Milagra activities by posting flyers in Pacifica and at school.

- Weed front and back circles and demo garden.

Group Workday Activities

- Finish pot washing and sterilizing.

- Assemble racks of pots (whack them into collars with a board or piece of PVC pipe - this takes longer than you think). A group of eight to ten students could do this each week. Keep the pots and racks off the ground - they can be contaminated by fungus spores!

- Wildflower walk! Classes go out with the SSP Intern at Milagra Ridge.

- Weed and possibly collect seed on Milagra Ridge.

- Weed front and back circles and demo garden.

May

Springtime! Time to start planting.

Nursery Activities for Interns

- Get species list and Oceana propagation goals for this growing season from SSP. This is printed out from the nursery database, file name: Reports/Nursery Reports/Propagation Requirements by Nursery/Oceana.

- Discuss plans/attend training with Nursery Specialist and SSP Restoration Coordinator for beginning propagation.

- Pick up PHCA (*Phacelia californica*) and ERLA (*Eriogonum latifolium*, Coast buckwheat) seeds from Fort Funston or Headlands nurseries.

- Coordinate work groups from science classes.

- When propagating, **make sure the propagation and transplanting records** (in the white binder located in the shed) **are filled out and given to SSP intern** to enter in nursery database.

- Make sure each rack has two tags; if one falls out, we'll still know what's in the rack. Use pencil to write on tags, as ink washes/fades off and becomes illegible.

- Start regular walk-throughs of the nursery.

- Make sure trash is picked up around the nursery.

- Assist with promotion of summer nursery workdays and Milagra workdays by posting flyers at school and in Pacifica. Spread the word!

- Water front and back circles and demo garden several times each week, or implement a drip watering system.

Group Workday Activities

- Assemble racks of pots (see April for instructions).

- Sow PHCA; **see species propagation cards** and plan appropriate numbers for each month.

- Sow ERLA (see above). These activities need to be well coordinated, and work

best with small groups of three to five students. If pots are already cleaned, sterilized, and assembled, it should take two to three afternoons to finish sowing all these seeds.

- If appropriate, sow other species.

June

Keep on sowing! Plant, plant, plant! It's the end of the school year and we will need extra help when most of the students leave the program for summer—bring your friends, spread the word.

Nursery Activities for Interns

- Fill out planting/propagation records.

- Continue regular crop monitoring, report any diseases/pests to SSP intern ASAP.

- If appropriate, help SSP staff collect seeds at Milagra Ridge.

- Assist with promotion of summer nursery workdays and ridge workdays by posting flyers at school and in Pacifica. Spread the word!

- Water and monitor irrigation, greenhouse plants, etc. Adjust venting as needed.

- Inventory soil supplies and purchase as needed from Sloat Garden Supply.

- Weed if time permits.

Group Workday Activities

- Pull extra seedlings in the pots of PHCA and ERLA that were sowed last month; leave one shoot per pot (choose randomly—don't just leave the biggest one).

- Three to four weeks after sowing PHCA and ERLA, consolidate pots and re-sow any pots in which seed hasn't germinated. Retag the newly seeded pots.

- Move plants into shade house once well-established in greenhouse.

- Sow ACMI (*Achillea millefolium*, yarrow), BRCA (*Bromus carinatus*, California brome grass), and FERU (*Festuca rubra*, red fescue). See species propagation cards and

propagation goals for numbers.

- Mix potting soil and store in yellow bins.

July

Summer is here! Keep an eye on irrigation and temperatures to be sure the greenhouse stays warm but not hot. Adjust irrigation timer as needed. If temperatures go above 95 degrees, open door/vents more widely and call SSP staff.

Nursery Activities for Interns (and Small Groups)

- Four weeks after sowing all the seeds, re-sow any pots in which seed has not germinated. Keep up with pulling out extra seedlings in the pots. Avoid competition—leave one shoot per pot (choose randomly, don't just leave the biggest one).
- Move plants into shade house once well-established in greenhouse.
- Continue daily walk-through of greenhouse and shade areas. Pay special attention to the watering regime and report any diseases or insects you observe.
- Sow remaining seed as soon as it comes in.
- If appropriate, help SSP staff collect seeds.
- Attend SSP Milagra Ridge workdays and planning meetings.
- Water and weed front and back circles and demo garden.

August

Nursery Activities for Interns (and Small Groups)

- Continue July activities.
- Consolidate any dead/dying plants, inventory, and keep records.
- Prune plants if necessary (see instruction card).
- Fertilize PHCA and ERLA with Nutricote three months after sowing (see instruction card).
- Take strawberry cuttings: see instruc-

tions on page 58.

September

A new school year! SSP intern gives a thorough tour of the nursery and Milagra Ridge to nursery volunteers and participating science classes.

Nursery Activities for Interns

- Crop monitoring is a must! Pay close attention to the watering regime and report any diseases or pests on the plants.
- Move plants into shade house once well-established in greenhouse.
- Prune plants that have gotten too big for their pots (see instruction card).
- Fertilize BRCA, FERU, and ACMI and any other species with Nutricote after three months of growth (see instruction card).
- Coordinate group activities with the science classes and SSP.
- Assist with seed collection on Milagra Ridge.
- Water and weed front and back circles and demo garden.

Group Workday Activities

- Site Walk—explore Milagra Ridge, take a tour of the native plant nursery.
- Consolidate plants that have died, reinventory plants.
- Wash any pots that have accumulated from consolidation or from accidentally being dropped on the ground.
- Coordinate group activities with the science classes and SSP.
- Transplant strawberry cuttings from flats to 4-inch pots, using Sloat mix with perlite.
- Weed Milagra Ridge.

October

The days are getting shorter and growing season is coming to a close.

Nursery Activities for Interns

- Continue daily monitoring and nurs-

ery walk-through, move any diseased plants away from healthy plants as soon as you notice a problem.

- Monitor water content of soil, change watering regime (schedule) if necessary due to varying weather conditions.

- Weed around greenhouse, under benches, in shade area.

- Prune any plants that have grown too big for their pots (see instruction card).

- Fertilize (very lightly) any plants that were sown three months ago and have not been top-dressed with Nutricote (see instruction card). At this time of year, we just want to keep the plants healthy, not encourage new growth.

- Weed the front and back circles and demo garden.

Group Workday Activities

- Prune, weed, pick up trash, or consolidate plants. No urgent activities requiring big groups take place this month.

November

Winter is coming and the plants have probably stopped growing. The crop is “hardening off,” or getting used to the more severe weather and shorter days.

Nursery Activities for Interns

- Plants that will be outplanted this year are in the home stretch. Keep them alive until January! Continue daily walk-throughs, pay attention to watering regime. Make sure plants aren’t too wet. Watch for snails and slugs, diseases and pests.

- Prune, if necessary, keeping in mind that plants are basically finished growing for the year (see instruction card).

- Create and post flyers to recruit volunteers for December’s outplanting season at Milagra Ridge.

- Pick up trash around the site.

- Weed front and back circles, demo garden, and in/around nursery.

Group Workday Activities

- Weed Milagra Ridge.

- Take inventory in nursery and do any necessary upkeep.

- Weed front and back circles, demo garden, and nursery area.

December

Outplanting season will start if the rains have begun. There should be about 3,000 plants in the Oceana Native Plant Nursery now.

Nursery Activities for Interns

- Continue daily walk-through and crop monitoring, checking closely for diseases and pests and proper watering regime.

- Consolidate and inventory plants available for outplanting.

- Evaluate each crop (species). On the back of the Species Information Sheet for each species, write how the crop grew during the season and what you would do differently next year.

- Assist in getting appropriate plants up to Milagra for work days.

- Pot washing begins again.

Group Workday Activities

- Start washing and sterilizing those pots (see instruction card).

- Outplant your beautiful crop of plants!

2.3 INVASIVE EXOTICS

Much of the restoration work we perform in the park is required because of the destruction of the indigenous plants by invasive exotics that have come into our habitats in many ways. Most have come from our own yards. Many are popular **landscape plants** that thrive because they came from Australia, South Africa, the Mediterranean, or other places with

climatic conditions similar to those of the Bay Area. They arrive without their natural enemies, the fungal spores, bugs, or slugs that keep them in check.

The indigenous plants cannot compete with the invasive plants because the natives have natural enemies and have adapted to the area in balance with the rest of the species. When exotic invasive plants are **introduced**, native habitats are often completely destroyed. The mammals, insects, reptiles, amphibians, birds, and fungi that are dependent on the native plant community lose their home. Studies in the park and elsewhere show a significant drop in number of animal species in most exotic plant areas. The first step in most of our projects, therefore, is the removal of invasive exotic plants. (You can help with this essential step in the re-establishment of vibrant indigenous habitats by removing invasive plants at SSP workdays on Milagra Ridge, or with Oceana Native Plant Nursery groups doing weed removal on the ridge.)

Each species grows and spreads differently, and we use different tools and methods to remove each one. When you participate in removal projects, you may use picks, weed wrenches, saws, pulaskis, and other tools that help you get the roots out. Some species, such as Cape ivy and iceplant, must not be left in contact with bare ground or they will resprout. We leave the waste piles on tarps, or on concrete where possible. For most species, we make every effort to remove the plants before they drop seed for the next generation. With species such as pampas grass, we try to get the **seed plumes** out even if we don't have time to remove the whole plant. Removing weeds is easiest when the ground is soft and moist. However, if it's too muddy, removing weeds can be more difficult because mud sticks to the plant roots, shoes, and tools.

The Most Invasive Plants at Milagra Ridge

Even if you don't participate in removal, you can help by not planting any of the following plants in your yard.

- ❑ Bellardia (*Bellardia trixago*): A bit like a small Indian paintbrush with tiny white-pink flowers; grows in big patches (native to the Mediterranean).
- ❑ Cape ivy (*Delairea odorata*): Bright green vine with small yellow flowers, grows all over indigenous plants (native to Cape of South Africa).
- ❑ Cotoneaster (*Cotoneaster* sp.): Woody shrub, red berries in fall (native to China).
- ❑ Eucalyptus (*Eucalyptus globulus*): Tree with peeling bark and strong smell (native to Australia and Tasmania).
- ❑ Fennel (*Foeniculum vulgare*): Lacy leaves like a fern; strong, sweet smell; tall stalk with tiny yellow flowers, grayish seed head (native to the Mediterranean).
- ❑ French broom (*Genista monspessulana*): Upright shrub with bright yellow flowers and hairy leaves (native to the Mediterranean).
- ❑ Iceplant (*Mesembryanthemum* sp.): Succulent vine with bright yellow or pink flowers, spreads along coastal dunes and hillsides (native to South Africa).
- ❑ Monterey cypress (*Cupressus macrocarpa*): Common cypress tree, strong smell (native to Monterey, California).
- ❑ Monterey pine (*Pinus radiata*): Common pine, needles in bundles of three (native to Monterey, California).
- ❑ Mustard (*Brassica* sp.): Abundant weedy plant with small yellow flowers in spring (native to Europe).
- ❑ Napa thistle (*Centaurea melitensis*): Resembles yellow star thistle, with spiny flowers that appear purple and then yellow; grows in patches (native to the Mediterranean).

- ❑ Ox-eye daisy (*Leucanthemum vulgare*): White daisy on a stalk about 1 foot high, often growing in clumps (native to Europe and Asia).
- ❑ Pampas grass (*Cortaderia jubata*): Huge bunch grass with tall plumes of seeds and sharp-edged leaves (native to Peruvian Andes).
- ❑ Poison hemlock (*Conium maculatum*): Tall with green lacy leaves and stem speckled with red/maroon; tiny white flowers in flower heads—it resembles fennel (native to Europe).
- ❑ Radish (*Raphanus sativus*): Abundant weedy plant with small white/lavender flowers (native to China).
- ❑ Scotch broom (*Cytisus scoparius*): Similar to French broom but broader plant; leaves are often smaller, less hairy, and brighter green, stem more angular, and flowers even brighter gold (native to the Mediterranean).
- ❑ Tea Tree (*Melaleuca alternifolia*): Woody shrub planted above the bunkers (native to Australia).
- ❑ Tower of Jewels (*Echium wildpretii*): Tall spike of purple flowers in spring, often seen on coastal hillsides (native to Canary Islands).